

IN THE CLAIMS:

The following is a complete listing of the claims, and replaces all earlier listings and versions:

1-11. (Cancelled)

12. (Original) An optical line terminal, comprising:

a line interface having a line side transmit port for transmitting an optical signal and a line side receiver port for receiving an optical signal;

a port side interface having a port side transmit port for transmitting an optical signal and a port side receive port for receiving an optical signal;

and a transponder connected to the line side transmit port and the line side receive port of said line side interface, and also connected to the port side transmit port and port side receive port of said port side interface, said transponder including a loopback mechanism for one of looping back the received optical signal at the line side receive port to the line side transmit port and looping back the received optical signal at the port side receive port to the port side transmit port.

13. (Original) An optical node comprising:

a line side transmit interface for transmitting one or more of a plurality of optical wavelengths;

an associated line side receive interface for receiving one or more of a plurality of optical wavelengths; and

a loopback mechanism for looping back one or more of the plurality of optical wavelengths received at said line side receive interface to the line side transmit interface without converting the optical wavelengths to electrical form.

14. (Currently Amended) An optical node comprising:

a first optical line terminal having an all-optical-pass-through port side interface including a plurality of port side transmit ports, each for transmitting a different one of a plurality of optical wavelengths, and a plurality of associated port side receive ports, each for receiving the different one of the plurality of optical wavelengths, said first optical line terminal including at least one transponder connected to a predetermined one of said transmit ports and also connected to the associated one of said port side receive ports, the one transponder including a loopback mechanism for looping back the received optical wavelength at the associated one of said port side receive ports to the predetermined one of said port side transmit ports;

a second optical line terminal having an all-optical-pass-through port side interface including a plurality of port side transmit ports, each for transmitting a different one of the plurality of optical wavelengths, and a plurality of associated port side receive ports, each for receiving the different one of the plurality of optical wavelengths, said second optical line terminal including at least one transponder connected to a predetermined one of said port side transmit ports and also connected to the associated one of said port side receive ports, the one transponder including a loopback mechanism for looping back the received optical wavelength at the associated one of said port side receive ports to the predetermined one of said port side transmit ports; and

an optical connection, ~~connecting means~~ for optically connecting at least one of the port side transmit ports of said first optical line terminal to at least one of the port side receive ports of said second optical line terminal, and for connecting the associated port side receive port of said first optical line terminal to the associated transmit port of the second optical line terminal.

15. (Currently Amended) An optical network comprising:

n, where n is an integer, optical nodes, including a source node for providing an optical signal, and a destination node for receiving the optical signal;

optical fibers for optically connecting said n nodes, and for carrying the optical signal from said source node to said destination node via intermediate nodes; and

~~means~~ an optical loop-back circuit, for looping back the optical signal at anyone of said n nodes to n preceding node without converting the optical signal to an electrical signal.

16. (Original) An optical line terminal comprising:

a line interface having a line side transmit port for transmit port for transmitting an optical signal and a line side receive port for receiving an optical signal;

at least one transponder having a transmit output terminal for transmitting an optical signal and a receive input terminal for receiving an optical signal; and

at least one optical switch having four terminals, with the first terminal connected to the line side receive port and the second terminal connected to the

line side transmit port of said line interface, and the third terminal connected to the receive input terminal and the fourth terminal connected to the transmit output terminal of said transponder, said one optical switch having a normal state in which a first optical path is provided from the first terminal to the third terminal of said one optical switch to provide an optical connection from the line side receive port of said line interface to the receive input terminal of said transponder, and a second optical path is provided from the second terminal to the fourth terminal of said optical switch to provide an optical connection from the transmit output port of said transponder to the line side transmit port of said line side interface, said one optical switch having a loopback state in which a third optical path is provided from the first terminal to the second terminal of said one optical switch to loopback the optical signal received at the line side receive port to the line side transmit port of said line interface, and a fourth optical path is provided from the third terminal to the fourth terminal of said one optical switch to loopback the optical signal transmitted from the transmit output terminal to the receive input terminal of said transponder.

17. (Original) An optical line terminal comprising:

a line interface having a line side transmit port for transmitting an optical signal and a line side receive port for receiving an optical signal;

at least one transponder having a transmit output terminal for transmitting an optical signal and a receive input terminal for receiving an optical signal;
and

at least one optical switch for looping back the optical signal received at the line side receive port to the line side transmit port of said line side interface, and for looping back the optical signal transmitted from the transmit output terminal to the

receive input terminal of said transponder, said optical switch having first and second switch terminals connected to the line side transmit port and line side receive port, respectively, of said line interface, and having third and fourth switch terminals connected to the transmit output terminal and the receive input terminal, respectively, of said transponder.

18-29. (Cancelled)

30. (New) The optical line terminal of claim 12, wherein the loopback mechanism comprises:

a first switch connected to switch the received optical signal at the line side receive port between a first path leading to the port side transmit port and a second path leading to the line side transmit port;

a second switch connected to select between the second path and a third path leading from the port side receive port and to provide an output leading to the line side transmit port;

a third switch connected to select between the first path and a fourth path leading from the port side receive port and to provide an output leading to the port side transmit port; and

a fourth switch connected to switch the received optical signal at the port side receive port between the third path leading to the line side receive port and the fourth path leading to the port side transmit port.

31. (New) The optical line terminal of claim 12, further comprising a multiplexer/demultiplexer connected between the transponder and the port side transmit and receive ports.

32. (New) The optical node of claim 13, further comprising:
a second line side transmit interface for transmitting one or more of a plurality of optical wavelengths; and
an associated second line side receive interface for receiving one or more of a plurality of optical wavelengths,
wherein the loopback mechanism is operable to loop back one or more of the plurality of optical wavelengths received at the second line side receive interface to the second line side transmit interface without converting the optical wavelengths to electrical form.

33. (New) The optical node of claim 32, wherein the loopback mechanism comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the optical switch further having a second input port.

34. (New) The optical node of claim 33, further comprising a multiplexer/demultiplexer connected between the line side transmit and receive ports and the 2x2 optical switch.

35. (New) The optical node of claim 33, wherein the loopback mechanism further comprises a second 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the second line side receive interface, the second optical switch being adapted to output the received optical wavelength from a first output port to the second line side transmit port or from a second output port, the second optical switch further having a second input port.

36. (New) The optical node of claim 35, further comprising a second multiplexer/demultiplexer connected between the second line side transmit and receive ports and the second 2x2 optical switch.

37. (New) The optical node of claim 13, wherein the loopback mechanism comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the optical switch further having a second input port.

38. (New) The optical network of claim 15, further comprising:
a line side transmit interface for transmitting one or more of a plurality of optical wavelengths to the optical nodes;
an associated line side receive interface for receiving one or more of a plurality of optical wavelengths from the optical nodes;

a second line side transmit interface for transmitting one or more of a plurality of optical wavelengths to the optical nodes; and

an associated second line side receive interface for receiving one or more of a plurality of optical wavelengths from the optical nodes,

wherein the optical loop-back circuit comprises a 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the line side receive interface, the optical switch being adapted to output the received optical wavelength from a first output port to the line side transmit port or from a second output port, the optical switch further having a second input port.

39. (New) The optical network of claim 38, wherein the optical loop-back circuit further comprises a second 2x2 optical switch having a first input port connected to receive at least one of the optical wavelengths received at the second line side receive interface, the second optical switch being adapted to output the received optical wavelength from a first output port to the second line side transmit port or from a second output port, the second optical switch further having a second input port.